<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22001</td>
<td>Side Frame, Terminal 2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>GE-22002</td>
<td>Front Frame, Terminal 1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22003</td>
<td>Horizontal Support, Terminal 2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>GE-22004</td>
<td>Chute Assembly, Terminal 2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>GE-22007</td>
<td>Conduit, Terminal 2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>GE-22008</td>
<td>Plastic, Purple Plane</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>GE-22009</td>
<td>Guard Assembly, Terminal 2</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>GE-22013</td>
<td>Side Plastic, Terminal 2</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>GE-22014</td>
<td>Front Plastic, Terminal 1</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>GE-22016</td>
<td>Outer Ramp Assembly, Left</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>GE-22017</td>
<td>Outer Ramp Assembly, Right</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>GE-22022</td>
<td>Inner Ramp</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>GE-22024</td>
<td>Edge Protector 46&quot;</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>GE-22026</td>
<td>Terminal Chain</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>GE-22027</td>
<td>Roof</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>hex_25_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot; x 0.75&quot; long, fully threaded</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>pin_quick_ring_25_2.3125</td>
<td>Pin, Ring-Grip Quick Release with SS Ring, 1/4&quot; Diameter, 2.3125&quot; Usable Length</td>
<td>8</td>
</tr>
</tbody>
</table>

**UNLESS OTHERWISE SPECIFIED:**

DIMENSIONS ARE IN INCHES TO TOLERANCES:
- FRACTIONAL: 1/2
- ANGULAR: MACH 1° BEND ±1°
- TWO PLACE DECIMAL: ±0.01

**MATERIAL/FINISH:**

**PROPRIETARY AND CONFIDENTIAL:**

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

**COMMENTS:**
- REMOVE ALL BURRS AND SHARP EDGES.

**DO NOT SCALE DRAWING**
1. Remove protective coating off the loop fastener on Items 10 and 11.
2. Press Items 10 and 11 on to Item 2 firmly as shown to adhere the fastener.

Press Item 12 (x2) to Items 10 and 11 as shown to ensure loop fastener adheres to Item 12.

Lock Item 5 in place with Item 17, 4 places.

Use 120lb cable ties at all locations

Attached to Alliance Wall (not shown)

Attached to Guardrail (not shown)

Use 50lb cable ties at all locations.

1. Remove protective coating off the loop fastener on Items 10 and 11.
2. Press Items 10 and 11 on to Item 2 firmly as shown to adhere the fastener.
Secure with 50lb cable ties at all available locations

Insert tabs of Item 3 into slots of Item 1

Secure subassembly from last step to Item 2 using Item 17 (X4)
Attach Item 7 using Item 16

Secure using 50lb cable ties

Attach Item 13 to the edges of Item 3 and 4 that are closest to the human player.
Note: Item 6 is installed both sides of the channel.

Only two rivets per set of four holes, as shown.

Notes:
1. Tag or label with part number

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22001-01</td>
<td>14 GA Steel, Preplated</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22001-02</td>
<td>14 GA, Steel, Preplated</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22001-03</td>
<td>14 GA, Steel, Preplated</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22001-04</td>
<td>14 GA, Steel, Preplated</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>GE-22001-05</td>
<td>14 GA Steel, Preplated</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>pem_clinchnut..25_20_.054</td>
<td>1/4-20 self-clinching nut., .054 shank</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>rivet_.1875_.126-.25</td>
<td>3/16&quot; Rivet, 126-25 Grip Range</td>
<td>24</td>
</tr>
</tbody>
</table>

Note: Item 6 is installed both sides of the channel.

Only two rivets per set of four holes, as shown.

Notes:
1. Tag or label with part number

<table>
<thead>
<tr>
<th>ZONE</th>
<th>REV.</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>APPROVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3</td>
<td>A</td>
<td>Redesigned slot shape.</td>
<td>8/27/2021</td>
<td>DF</td>
</tr>
</tbody>
</table>

Scale: 1:8

Title: Side Frame, Terminal

Do not scale drawing.

Material/Finish:

- The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without written permission of FIRST® is prohibited.
- Removing all burrs and sharp edges.

Dimensions are in inches.

Tolerances:
- Fractional: ±1/16
- Angular, Mach: ±1°
- Two Place Decimal: ±.001
- Three Place Decimal: ±.0001

Mosque, 1990
### Dimensions

<table>
<thead>
<tr>
<th>Layer</th>
<th>Layer Thickness</th>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.075</td>
<td>2.25</td>
<td>1.50</td>
</tr>
<tr>
<td>2</td>
<td>0.075</td>
<td>2.10</td>
<td>1.50</td>
</tr>
<tr>
<td>3</td>
<td>0.075</td>
<td>2.10</td>
<td>1.50</td>
</tr>
</tbody>
</table>

### Side Frame, Terminal

- **Drawing Number**: GE-22001
- **scale**: 1:8
- **Sheet**: 2 of 3

- **Material/Finish**: [provide detailed material and finish specifications]

- **Comments**: Remove all burrs and sharp edges.

---

**UNLESS OTHERWISE SPECIFIED:**

- **Tolerances**:
  - Fractional: ±1/16
  - Angular, Machined: ±1°
  - TWO PLACE DECIMAL: ±0.01
  - THREE PLACE DECIMAL: ±0.005

---

**Title**: Side Frame, Terminal

**Drawing Number**: GE-22001

**Scale**: 1:8

**Sheet**: 2 of 3

---

**Comments**: Remove all burrs and sharp edges.

**Material/Finish**: [provide detailed material and finish specifications]
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22002-01</td>
<td>1.75&quot; x .125&quot; thk. Square Tube, 6061 Aluminum</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>GE-22002-02</td>
<td>1-1/4&quot; Schedule 40 Pipe, 6061 Aluminum</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>GE-22002-03</td>
<td>1.75&quot; x .125&quot; thk. Square Tube, 6061 Aluminum</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>GE-22002-04</td>
<td>1-1/4&quot; Schedule 40 Pipe, 6061 Aluminum</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>GE-22002-05</td>
<td>1-1/4&quot; Schedule 40 Pipe, 6061 Aluminum</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>GE-22002-06</td>
<td>1.75&quot; x .125&quot; thk. Square Tube, 6061 Aluminum</td>
<td>4</td>
</tr>
</tbody>
</table>

Notes:
1. Tag or label with part number.
No weld permissible on inside of tubes, 3 Places

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: \(1/16\) ANGULAR, MACH: \(1°\) BEND
TWO PLACE DECIMAL: \(0.02\)
THREE PLACE DECIMAL: \(0.015\)
MATERIAL/FINISH:
DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

No weld permissible on inside of tubes, 3 Places

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: \(1/16\) ANGULAR, MACH: \(1°\) BEND
TWO PLACE DECIMAL: \(0.02\)
THREE PLACE DECIMAL: \(0.015\)
MATERIAL/FINISH:
DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

No weld permissible on inside of tubes, 3 Places

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: \(1/16\) ANGULAR, MACH: \(1°\) BEND
TWO PLACE DECIMAL: \(0.02\)
THREE PLACE DECIMAL: \(0.015\)
MATERIAL/FINISH:
DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.
UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR, MACH: 1° BEND, 1/16
TWO PLACE DECIMAL: 0.02
THREE PLACE DECIMAL: 0.015

MATERIAL/FINISH:

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR, MACH: 1° BEND, 1/16
TWO PLACE DECIMAL: 0.02
THREE PLACE DECIMAL: 0.015

MATERIAL/FINISH:

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR, MACH: 1° BEND, 1/16
TWO PLACE DECIMAL: 0.02
THREE PLACE DECIMAL: 0.015

MATERIAL/FINISH:

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR, MACH: 1° BEND, 1/16
TWO PLACE DECIMAL: 0.02
THREE PLACE DECIMAL: 0.015

MATERIAL/FINISH:

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR, MACH: 1° BEND, 1/16
TWO PLACE DECIMAL: 0.02
THREE PLACE DECIMAL: 0.015

MATERIAL/FINISH:

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.
Horizontal Support, Terminal

Notes:
1. Tag or label with part number.

DIMENSIONS ARE IN INCHES

TOLERANCES:
- FRACTIONAL: ±1/16
- ANGULAR, MACH: ±1° BEND
- TWO PLACE DECIMAL: ±0.02
- THREE PLACE DECIMAL: ±0.010

MATERIAL/FINISH:
12 ga. 5052 Aluminum

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

UNLESS OTHERWISE SPECIFIED:

BEND  NAME  DATE
DRAWN  DF  4/2/2021

MATERIAL/FINISH:
12 ga. 5052 Aluminum

SCALE: 1:2
SHEET 1 OF 1

DRAWN
DF
4/2/2021

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:
- FRACTIONAL: ±1/16
- ANGULAR, MACH: ±1° BEND
- TWO PLACE DECIMAL: ±0.02
- THREE PLACE DECIMAL: ±0.010

MATERIAL/FINISH:
12 ga. 5052 Aluminum

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:
- FRACTIONAL: ±1/16
- ANGULAR, MACH: ±1° BEND
- TWO PLACE DECIMAL: ±0.02
- THREE PLACE DECIMAL: ±0.010

MATERIAL/FINISH:
12 ga. 5052 Aluminum

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:
- FRACTIONAL: ±1/16
- ANGULAR, MACH: ±1° BEND
- TWO PLACE DECIMAL: ±0.02
- THREE PLACE DECIMAL: ±0.010

MATERIAL/FINISH:
12 ga. 5052 Aluminum

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22005</td>
<td>Bed, Chute Assembly</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22006</td>
<td>Angle, Chute Assembly</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>rivet_.1875_.251-.375</td>
<td>3/16&quot; Aluminum Rivet, .251-.375 Grip Range</td>
<td>28</td>
</tr>
</tbody>
</table>

**UNLESS OTHERWISE SPECIFIED:**

- **DIMENSIONS ARE IN INCHES**
- **TOLERANCES:**
  - FRACTIONAL: ±1/2
  - ANGULAR, MACH: ±1°
  - BEND: ±1°
  - TWO PLACE DECIMAL: ±0.005

**MATERIAL/FINISH:**

- Tag or Label with
- Part Number

**PROPRIETARY AND CONFIDENTIAL:**

The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

**COMMENTS:**

- REMOVE ALL BURRS AND SHARP EDGES.

**DO NOT SCALE DRAWING**

**TITLE:** Chute Assembly, Terminal

**SIZE**

- DWG. NO. GE-22004
- SCALE: 1:4
- SHEET 1 OF 1

**SCALE:** 1:4

**DRAWN:** DF 8/13/2021

**REV:**
<table>
<thead>
<tr>
<th>REVISIONS</th>
<th>ZONE</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>APPROVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>202102001</td>
<td>A</td>
<td>0.21</td>
<td>35.13 was 35.63, 32.88 was 32.38, 6.38 was 6.88, 3.13 was 3.63</td>
<td>8/27/21</td>
<td>DAF</td>
</tr>
</tbody>
</table>

Notes:
1. Label or tag with part number.

**SCALE: 1:4**

**TITLE:** Bed, Chute Assembly

**MATERIAL/FINISH:**
- 1/4" Polycarbonate, Clear

**DIMENSIONS ARE IN INCHES**
- TOLERANCES:
  - FRACTIONAL: ±1/16
  - ANGULAR: Mach 1° BEND: ±1°
  - TWO PLACE DECIMAL: ±0.01
  - THREE PLACE DECIMAL: ±0.005

**REPROPRIETARY AND CONFIDENTIAL**
- PROPRIETARY AND CONFIDENTIAL
  - THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

**COMMENTS:**
- REMOVE ALL BURRS AND SHARP EDGES.

**DO NOT SCALE DRAWING**
Notes:
1. Tag or label with part number.

Unless otherwise specified:
Dimensions are in inches.
Tolerances:
Fractional: \(\pm\frac{1}{16}\)
Angular, Mach: \(\pm\frac{1}{16}\) Bend, \(\pm\frac{1}{32}\)
Three place decimal: \(\pm0.010\)

Material/Finish:
12 ga. 5052 Aluminum

Proprietary and Confidential
The information contained in this drawing is the sole property of FIRST\®. Any reproduction in part or as a whole without the written permission of FIRST\® is prohibited.

Comments:
Remove all burrs and sharp edges.

CAD Drawing

Title: Angle, Chute Assembly

Scale: 1:1

Do Not Scale Drawing
Tag or label with part number.

Conduit, Terminal

Material/Finish:
3/4" Galvanized Steel EMT

Dimensions are in inches.

Tolerances:
- Fractional: ±1/16
- Angular, Mach: ±1° Bend
- Two place decimal: ±0.01
- Three place decimal: ±0.005

Proprietary and Confidential:
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
- Remove all burrs and sharp edges.

DO NOT SCALE DRAWING.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22010</td>
<td>Guard Bracket, Right</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22011</td>
<td>Guard Pipe</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>GE-22012</td>
<td>Guard Bracket, Left</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>tube_nut_25_20</td>
<td>Tube-Connecting Nut, for 1.37&quot; To 1.4&quot; Tube Id, 1/4&quot;-20 Thread Size</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>hex_25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>4</td>
</tr>
</tbody>
</table>

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL: ±1/2
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL: ±.00

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

FIELD | NAME  | DATE  |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DRAWN</td>
<td>DF</td>
<td>12/29/2021</td>
</tr>
</tbody>
</table>

TITLE: Guard Assembly, Terminal

SIZE | DWG. NO. | REV |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>GE-22009</td>
<td></td>
</tr>
</tbody>
</table>
Guard Bracket, Right

Label or tag with part number.

Material/Finish:
14 ga. Pre-plated Steel

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR, MACH: ±1° BEND: ±1°
TWO PLACE DECIMAL: ±.002
THREE PLACE DECIMAL: ±.010

Proprietary and Confidential
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
Remove all burrs and sharp edges.

Do not scale drawing.
Tag or label with part number.

Tag or label with part number.

Tag or label with part number.

Tag or label with part number.
Guard Bracket, Left

14 ga. Pre-Plated Steel

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL: 1/16

ANGULAR, MACH: 1° BEND: 1°

TWO PLACE DECIMAL: 0.00

THREE PLACE DECIMAL: 0.000

MATERIAL/FINISH:

14 ga. Pre-Plated Steel

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

Label or tag with part number

DO NOT SCALE DRAWING
Tag or label with part number.
Notes:
1. Tag or label with part number.
2. Part will receive vinyl graphics.
Trim vinyl at hole locations 25 Places

Trim vinyl at hole locations 25 Places

Vinyl applied to this face

Notes:
1. Tag or label with part number
2. Vinyl 50/50 Mesh with clear protective coating.
Notes:
1. Attach hook fastener to the ramp brackets.
2. Attach loop fastener to the hook fastener, but leave the protective plastic backing on until final assembly of the TERMINAL.
Notes:
1. Attach hook fastener to the ramp brackets.
2. Attach loop fastener to the hook fastener, but leave the protective backing on until final assembly of the TERMINAL.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22018</td>
<td>Ramp Bracket, Mid</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22019</td>
<td>Ramp Bracket, Edge</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>GE-22021</td>
<td>Outer Ramp, Right</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>flat_phil_.25_20_1.25</td>
<td>Steel Phillips Flat Head Screw, 1/4&quot;x20 x 1.25&quot; long, fully threaded</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Hook_1_16</td>
<td>1&quot; x 16&quot; Hook, Adhesive Backed</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Loop_1_16</td>
<td>1&quot; x 16&quot; Loop, Adhesive Backed</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Hook_1_1</td>
<td>1&quot; x 1&quot; Hook, Adhesive Backed</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Loop_1_1</td>
<td>1&quot; x 1&quot; Loop, Adhesive Backed</td>
<td>4</td>
</tr>
</tbody>
</table>
Ramp Bracket, Mid

Notes:
1. Tag or label with part number.

<table>
<thead>
<tr>
<th>UNLESS OTHERWISE SPECIFIED:</th>
<th>BEND</th>
<th>NAME</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMENSIONS ARE IN INCHES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOLERANCES:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRACTIONAL: 1/16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANGULAR: MACH 1° BEND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWO PLACE DECIMAL 0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THREE PLACE DECIMAL 0.010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/FINISH:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 ga. Pre-plated Steel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
- REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

TITLE: Ramp Bracket, Mid

SCALE: 1:2

REV C

GE-22018

SIZE: DWG. NO.

DRAWN: DF 4/9/2021

NAME DATE

COMMENTS:

DRAWN

MATERIAL/FINISH:

DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE SPECIFIED:

TOLERANCES:

FRACTIONAL: 1/16
ANGULAR: MACH 1° BEND
TWO PLACE DECIMAL 0.02
THREE PLACE DECIMAL 0.010

MATERIAL/FINISH:
8 ga. Pre-plated Steel

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
- REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING
Notes:
1. Tag or label with part number.
Notes:
1. Tag or label with part number

2X R.25

4X R.25

9.47

22.63

28.41

46.00

.25

.47

.41

.00

.05

.01

POLYCARBONATE, CLEAR
DESCRIPTION: U SHAPE EDGE PROTECTORS
VENDOR: M2CBRIDGE VIA AMAZON
COLOR: BLACK
PACKAGE QUANTITY: 1 - 6.5 FEET
NOTES:
1. SUBSTITUTIONS ALLOWED
2. CUT TO LENGTH

DO NOT SCALE DRAWING
**Description:** CHAINBOSS Plastic Chain: US Weight 2 in., Black  
**Vendor:** The Home Depot  
**Part Number:** [internet] 315968945

Substitutions allowed with permission from FIRST HQ.
Notes:
1. Bag or tag with part number.
Assembly exists in Red and Blue configurations.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FE-01002</td>
<td>4’ x 1’ x 1’ Square Truss</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>FE-01003</td>
<td>5’ x 1’ x 1’ Square Truss</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>FE-01012</td>
<td>3 Way Corner Block</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>GE-22101</td>
<td>Floor Protection Assembly</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>GE-22107</td>
<td>Launch pad blue</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>GE-22111</td>
<td>Low bar holder</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>GE-22112</td>
<td>Low bar clamp</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>GE-22120</td>
<td>under hung assembly</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>GE-22130</td>
<td>Upper transition bar holder</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>GE-22140</td>
<td>mid transition bar holder</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>GE-22150</td>
<td>Rung</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>GE-22170</td>
<td>Truss Base - Sheet Metal Assembly</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>hex_.25_20_1.25</td>
<td>Steel Hex Head Screw, 1/4“-20 x 1.25” long, fully threaded</td>
<td>16</td>
</tr>
<tr>
<td>14</td>
<td>hex_.375_16_3_partial</td>
<td>Steel Hex Head Screw, 3/8”-16, 3” long</td>
<td>13</td>
</tr>
<tr>
<td>15</td>
<td>hex_.425_11_2.00</td>
<td>Hex Head Bolt, 5/8”-11 Thread, 2” length</td>
<td>56</td>
</tr>
<tr>
<td>16</td>
<td>hexnut_.625_11</td>
<td>5/8”-11 hex nut</td>
<td>40</td>
</tr>
<tr>
<td>17</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4”-20</td>
<td>16</td>
</tr>
<tr>
<td>18</td>
<td>nylock_.375_16</td>
<td>Steel Nylon-Insert Locknut, 3/8”-16</td>
<td>12</td>
</tr>
<tr>
<td>19</td>
<td>tapeLine_HANGARHeight</td>
<td>2” Gaffers Tape, Black</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>bolt_.375_2.4375_4.4375</td>
<td>3-Bolt 3/8-16 x 2-7/16 ID x 4-7/16 height</td>
<td>16</td>
</tr>
<tr>
<td>21</td>
<td>washer_flat_.25</td>
<td>Flat Washer for 1/4” Screw</td>
<td>32</td>
</tr>
<tr>
<td>22</td>
<td>washer_flat_.625</td>
<td>Flat washer for 5/8” screw</td>
<td>96</td>
</tr>
</tbody>
</table>
48.72
Field carpet to top of RUNG

60.26
Floor protection to top of RUNG

75.59
Floor protection to top of RUNG

90.94
Floor protection to top of RUNG

Notes:
1. Dimensions in parentheses are for reference only.

DETAIL A
SCALE 1:9

84.00±1.00

32.59°

56.97

28.48

15.34

24.00

24.00

field carpet to top of RUNG

A

B

C

D

Hangar

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/2
ANGULAR, Mach ±1° BEND ±1°
TWO PLACE DECIMAL ±.50

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

MATERIAL/FINISH:

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

DO NOT SCALE DRAWING

FIELD NAME DATE
DRAWN NW 9/29/2020

C

GE-22100

SCALE: 1:18 SHEET 5 OF 5

A

B

C

D
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22102</td>
<td>notched floor protection section</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>GE-22105</td>
<td>floor protection carpet</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22104</td>
<td>floor protection full</td>
<td>2</td>
</tr>
</tbody>
</table>

**Item 2 hidden for clarity**
Notes:
1. Label or tag part.
Notes:
1. Label or tag part.
Notes:
1. Label or mark with part number.
Notes:
1. Label or tag with part number.
Notes:
1. Label or tag with part number.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22121</td>
<td>Under hung plate</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22123</td>
<td>Pipe Saddle</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>FE-01016</td>
<td>Cheeseborough for Truss _ Single</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>nylock_5_13</td>
<td>Steel nylon-insert locknut, 1/2&quot; - 13</td>
<td>2</td>
</tr>
</tbody>
</table>
Notes:
1. Label or tag part.

Material/Finish:
.125" Pre-plated steel

Dimensional Tolerances:
- Fractional: ±1/16
- Angular: Machined ±1° Bend
- Two Place Decimal: ±.01
- Three Place Decimal: ±.005

Unless Otherwise Specified:
- Scale: 1:4
- All dimensions are in inches
- Tolerances apply to all dimensions

Proprietary and Confidential:
The information contained in this drawing is the sole property of First Robotics. Any reproduction in part or as a whole without the written permission of First Robotics is prohibited.

Comments:
- Remove all burrs and sharp edges.

Drawn: NW 1/15/2021

Title: Under Hung Plate

Sheet 1 of 1

Scale: 1:4

Legend:
- A - A
- B - B
- C - C
- D - D
Notes:
1. Label or tag with part number.

Pipe Saddle

Material/Finish:
1.5" sch 40 aluminum

Do not scale drawing.
ITEM NO. | PART NUMBER | DESCRIPTION | QTY.
--- | --- | --- | ---
1 | GE-22131 | upper bar base | 1
2 | GE-22132 | High bar side plate | 2
3 | GE-22133 | Upper holder cross | 3
4 | rivet .1875 .126-.25 | 3/16" Rivet, .126-.25 Grip Range | 36

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: \( \pm \frac{1}{16} \)
ANGULAR, MACH: \( \pm 1^\circ \)
TWO PLACE DECIMAL: \( \pm 0.01 \)
THREE PLACE DECIMAL: \( \pm 0.005 \)

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

SCALE: 1:8
SHEET 1 OF 3
Notes:
1. Rivet 3 to 2 with 3/16" steel rivets in three locations.

Notes:
1. Rivet 2 to step 1 with 3/16" steel rivets.
Step 3:

Notes:
Notes:
1. Tag or label with part number.
1.70 MIN THRU

18X \( \phi .191 \pm .002 \) THRU ALL

R2.00

Notes:
1. Tag or label part with part number.
Notes:
1. Tag or label part with part number.

Dimensions:
- 2x \( \varnothing .41 \) THRU ALL
- 3x \( \varnothing .191 \pm .002 \) THRU ALL

Material/Finish:
11 ga. pre-plated steel

Proprietary and Confidential
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.
2x Φ .40 THRU ALL 16x Φ .40 X .75 THRU ALL

Notes:
1. Tag or label part with part number.
Notes:
1. Tag or label part with part number.
### Notes:
1. Made from part GE-20030.
2. Remove parts GE-20030-03 from assembly.
3. Attach 4.
4. Place 6 and 5 or replace missing.

### Parts List

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>rivet_1675_126_25</td>
<td>3/16&quot; Rivet, .126-.25 Grip Range</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>GE-20030-01</td>
<td>Truss Base - Sheet Metal Assembly, Base Plate</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-20030-02</td>
<td>Truss Base - Sheet Metal Assembly, Truss Feet</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>nut_chassis_625_11</td>
<td>Nut, Chassis, 5/8-11</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Hook_4_24</td>
<td>4' x 24' Hook, Adhesive Backed</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Hook_4_16</td>
<td>4' x 16' Hook, Adhesive Backed</td>
<td>2</td>
</tr>
</tbody>
</table>
Notes:
1. Rivets should be plated or stainless steel.
2. Tag or label with part number.
3. Powder Coated Black (Full Assembly).

ITEM NO. | PART NUMBER | DESCRIPTION | QTY.
--- | --- | --- | ---
1 | rivet_.1875_.126-.25 | 3/16" Rivet, .126-.25 Grip Range | 20
2 | GE-20030 - 01 | Truss Base - Sheet Metal Assembly, Base Plate | 1
3 | GE-20030 - 02 | Truss Base - Sheet Metal Assembly, Truss Feet | 2
4 | GE-20030 - 03 | Truss Base - Sheet Metal Assembly, Berm - Red | 2
Notes:
1. Material: 12 Ga. (0.105") Mild Steel Sheet A366/1008 Cold Roll
2. Remove all burrs and sharp edges.
Notes:
1. Material: 0.125" Mild Steel Sheet A366/1008 Cold Roll
2. Remove all burrs and sharp edges.
Notes:
1. Material: 0.125" Mild Steel Sheet A366/1008 Cold Roll
2. Remove all burrs and sharp edges.
Note: Item Number: GE-22200-01
QTY: 3

Note: Item Number: GE-22200-02
QTY: 2

Note: Item Number: GE-22200-03
QTY: 1

Note: Item Number: GE-22200-04
QTY: 2

Dimensions are in inches.

Tolerances:
- Fractional: ±1/16
- Angular: Machined ±1° bend
- Two place decimal: ±0.02
- Three place decimal: ±0.015

Material/Finish:
- Tag or label with part number

Comments:
- Remove all burrs and sharp edges.

Proprietary and Confidential
The information contained in this drawing is the sole property of FIRST, any reproduction in part or as a whole without the written permission of FIRST is prohibited.

Title: Alliance Station Panel

Scale: 1:8

Sheet 3 of 3
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22200</td>
<td>GE-22200</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22201</td>
<td>Alliance Polycarbonate Face</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Hook_2_22</td>
<td>2&quot; x 22&quot; Hook, Adhesive Backed</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Hook_1_21</td>
<td>1&quot; x 21&quot; Hook, Adhesive Backed</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Loop_1_21</td>
<td>1&quot; x 21&quot; Loop, Adhesive Backed</td>
<td>1</td>
</tr>
</tbody>
</table>

UNLESS OTHERWISE SPECIFIED:

- PROPRIETARY AND CONFIDENTIAL
- THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

- MATERIAL/FINISH:
  - Tag or label with part number

- COMMENTS:
  - REMOVE ALL BURRS AND SHARP EDGES.

- DO NOT SCALE DRAWING

SCALE: 1:8  SHEET 1 OF 2
Assembly Steps:
1. Apply Item 4 to Item 1 as shown.
2. Apply Item 5 to Item 4, but keep the protective backing on the adhesive.
3. Apply Item 3 to Item 1 as shown, trim excess material or round over the edge.

Attach using 50 lb cable ties.

Assembly Steps:
1. Remove protective backing from the loop adhesive.
2. Place Item 2 in place and press against the loop.
3. Secure Item 2 with 50 lb cable ties.

Trim excess or round over corner.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22302</td>
<td>Leg to Upper Hub Box</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22303</td>
<td>Hub Base with Hook</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22305</td>
<td>Leg Vertical Channel Cover</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>GE-22306</td>
<td>Hub Fender Skirt</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>GE-22311</td>
<td>Lower Exit Assembly</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>GE-22341-Clear</td>
<td>Fender Assembly - Clear</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>GE-22341-Vinyl</td>
<td>Fender Assembly - Vinyl</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>GE-22346</td>
<td>Fender Pipe Assembly</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>GE-22351</td>
<td>Lower Hub</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>GE-22371</td>
<td>Hub Leg Assembly</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>GE-22391</td>
<td>Upper Exit Assembly</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>GE-22411</td>
<td>Upper Hub</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>hex_25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>36</td>
</tr>
<tr>
<td>14</td>
<td>hex_25_20_2.5_partial</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 2.5&quot; long, partially threaded</td>
<td>16</td>
</tr>
<tr>
<td>15</td>
<td>nylock_25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>24</td>
</tr>
<tr>
<td>16</td>
<td>pin_quick_ring_25_0.375</td>
<td>Pin, Ring Grip Quick Release with SS Ring, 1/4&quot; Diameter, 0.375&quot; Usable Length</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>tape_HUBLEGROBOTHEIGHT</td>
<td>2&quot; Gaffers Tape, Black</td>
<td>5</td>
</tr>
</tbody>
</table>
Notes:
1. Place 2 down.
2. Slide 5 in place against 2, aligning cutouts to pipes.
3. Attach 6 and 7 to 5 using 8.

Notes:
1. Attach 10 to 15 using 14 and 15.
2. Attach 10 to 1 using 13.

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/2
ANGULAR, MACH ±1° BEND ±1°
TWO PLACE DECIMAL ±.50

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

MATERIAL/FINISH:

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

DO NOT SCALE DRAWING
Notes:
1. Attach 11 to 10 using 13 and 15.
2. Insert 9 into receiving tubes of 2.

Notes:
1. Attach 12 to 1 using 13.
Notes:
1. Slide 5 into place flush against 2.
2. Attach 10 to 5 using 14 and 15.
3. Attach 10 to 1 using 13.

Notes:
1. Attach 6 and 7 to assembly using 8 to connect to 5. 7 should oppose other 7, and 6 should oppose other 6.
2. Attach 3 to 10 using 16.
3. Attach 11 to 10 using 13 and 15.

UNLESS OTHERWISE SPECIFIED:

FIELD | NAME | DATE
--- | --- | ---
ED | CO | 12/17/2021

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: \(1/2\)
ANGULAR: MACH: 1° BEND: 1°
TWO PLACE DECIMAL: \(\frac{1}{20}\)

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

MATERIAL/FINISH:

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

DESCRIPTIVE TABLE OF SYMBOLS

SHEET 4 OF 7

Hub
Notes:
1. Attach 4 to assembly, using cable ties to connect to 9 and either 6 or 7.
2. Attach 17 to 3 and 10, aligning bottom of 17 to notches on 3 and 10.
13.23
48.00±.50
UPPER HUB INNER DIAMETER

53.38±.25
UPPER HUB VISION TARGET DIAMETER

60.18±.50
LOWER HUB INNER DIAMETER

3.80
FENDER TO LOWER HUB INNER DIAMETER

7.20
FENDER TO UPPER HUB VISION TARGET RING

9.89
FENDER TO UPPER HUB INNER DIAMETER

33.89
FENDER TO HUB CENTER

46.91
WIDTH BETWEEN LOWER EXITS, MEASURED ALONG FENDER

13.23
### Notes:
1. Tag or label with part number.

### Proprietary and Confidential

The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

### Comments:
- Remove all burrs and sharp edges.

### Scale: 2:1

<table>
<thead>
<tr>
<th>Title</th>
<th>GE-22301</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>2:1</td>
</tr>
<tr>
<td>Sheet</td>
<td>1 of 1</td>
</tr>
</tbody>
</table>

### Sheet 1 of 1

<table>
<thead>
<tr>
<th>UNLESS OTHERWISE SPECIFIED:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMENSIONS ARE IN INCHES</td>
</tr>
<tr>
<td>TOLERANCES:</td>
</tr>
<tr>
<td>FRACTIONAL:</td>
</tr>
<tr>
<td>1/16</td>
</tr>
<tr>
<td>ANGULAR: MACH 1° BEND: 1°</td>
</tr>
<tr>
<td>TWO PLACE DECIMAL: .02</td>
</tr>
<tr>
<td>THREE PLACE DECIMAL: .010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATERIAL/FINISH:</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 ga. Pre-Plated Steel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BEND</th>
<th>NAME</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRAWN</th>
<th>KAMC</th>
<th>6/17/2021</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>PROPRIETARY AND CONFIDENTIAL</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>COMMENTS:</th>
</tr>
</thead>
</table>

| REMOVE ALL BURRS AND SHARP EDGES. |

<table>
<thead>
<tr>
<th>DO NOT SCALE DRAWING</th>
</tr>
</thead>
</table>

### Dimensions

- **Width:** 1.50
- **Height:** 2.00
- **Thickness:** 0.50
- **Bend:** .27
- **Angle:** 1°
Notes:
1. Tag or label with part number.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22302-01</td>
<td>14 Ga. Pre-plated steel</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>GE-22302-02</td>
<td>14 Ga. Pre-plated steel</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>pem_clinchnut_.25_20_.054</td>
<td>1/4-20 self-clinching nut, .054 shank</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>rivet_.1875_.126-.25</td>
<td>3/16&quot; Rivet, .126-.25 Grip Range</td>
<td>12</td>
</tr>
</tbody>
</table>
Notes:
1. Ensure surface of 1 is clean prior to hook application.
2. Attach 2 to 1 in locations shown.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22304</td>
<td>Hub Base</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Hook_2_9</td>
<td>2&quot; x 9&quot; Hook, Adhesive Backed</td>
<td>4</td>
</tr>
</tbody>
</table>
UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGLULAR, MACH: 1° BEND, 1°
TWO PLACE DECIMAL: .02
THREE PLACE DECIMAL: .015

MATERIAL/finish:
Powder Coated Black

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

DO NOT SCALE DRAWING

Notes:
1. Tag or label with part number.

ITEM NO. PART NUMBER DESCRIPTION QTY.
1 GE-22304-01 14 Ga. A-366/1008 Cold Roll Steel 1
2 GE-22304-02 1.25" Schedule 40 Pipe, A500 Steel 4

Hub Base

GE-22304

DRAWN: CO 7/19/2021

SCALE: 1:3 SHEET 1 OF 3

NOTE:

Remove all burrs and sharp edges.
Bottom of two assemblies coincident.

Notes:
1. For reference only: designed interface of GE-22304 with mating part.
Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH: ±2° BEND: ±1°
TWO PLACE DECIMAL: ±.01
THREE PLACE DECIMAL: ±.001

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

COMMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

PROPERTY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

SCALE 1:2

LEG VERTICAL CHANNEL COVER

DRAWN: KAMC
DATE: 7/6/2021

TITLE: LEG VERTICAL CHANNEL COVER

FILED WITH FIRST ROBOTICS® COMPETITION

BEND
NAME
DATE

drawn
KAMC
7/6/2021
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22326</td>
<td>Lower Exit Left Polycarbonate</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assembly</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GE-22327</td>
<td>Lower Exit Right Polycarbonate</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assembly</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GE-22329</td>
<td>Lower Exit Front Roof with Loop</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22331</td>
<td>Lower Exit Front Ramp with Loop</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>GE-22332</td>
<td>Lower Exit HDPE Wall</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>GE-22333</td>
<td>Lower Exit Back Ramp</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>GE-22334</td>
<td>Lower Exit Back Roof</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>GE-22336</td>
<td>Lower Exit Frame with Hook</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>GE-22461</td>
<td>Sensor Box Assembly</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>GE-22466</td>
<td>Sensor Light Shield</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>hex_.25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>8</td>
</tr>
<tr>
<td>12</td>
<td>hex_.25_20_1.25_partial</td>
<td>Steel Hex Head Bolt, 1/4&quot;-20 x 1.25&quot;, partially threaded</td>
<td>8</td>
</tr>
<tr>
<td>13</td>
<td>hex_.25_20_2.5_partial</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 2-1/2&quot; long, partially threaded</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>4</td>
</tr>
</tbody>
</table>
Notes:
1. Slide 5 into place inside of 8.
2. Fasten in place using 13 and 14.

Notes:
1. Slide 6 and 7 into assembly as shown.
2. Fasten in place in locations shown using 11.
Notes:
1. Attach 1, 2, and 3 to assembly as shown using hook and loop and cable ties.

Notes:
1. Insert 4 into assembly and attach via fastening hook and loop on 2.
Notes:
1. Attach 9 and 10 to assembly using 12.
3X Ø .42 THRU ALL
3X Ø .27 THRU ALL

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH ±1° BEND
TWO PLACE DECIMAL ±.01
THREE PLACE DECIMAL ±.005

MATERIAL/FINISH:
1/4" thick Polycarbonate, Clear

DO NOT SCALE DRAWING

NOTES:
1. Tag or label with part number.

REVISIONS
ZONE REV. DESCRIPTION DATE APPROVED
B2 A Additional hole added to allow ramp to be mounted at a steeper angle 1/11/2022 CPO

SCALE: 1:2
SIZE: GE-22324
REV: A
SHEET: 1 OF 1
Notes:
1. Tag or label with part number.

1.50
2.00
R.12
.09
2x .88
2x R.10

Notes:
1. Tag or label with part number.

11 Ga. 5052 Aluminum

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR, MACH: ±1° BEND: ±1°
TWO PLACE DECIMAL: ±.01
THREE PLACE DECIMAL: ±.001

MATERIAL/FINISH:
11 Ga. 5052 Aluminum

BEND NAME DATE
DRAWN CO 6/11/2021

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THE DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

DO NOT SCALE DRAWING

REVDWG. NO.
SIZE DWG. NO. REV
TITLE: Lower Exit Ramp Angle
SCALE: 1:1 SHEET 1 OF 1

GE-22325
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22324</td>
<td>Lower Exit Side Polycarbonate</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22337</td>
<td>Lower Exit Ramp Angle with Hook</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>hex_.25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Loop_1_14</td>
<td>1&quot; x 14&quot; Loop, Adhesive Backed</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Loop_1_18</td>
<td>1&quot; x 18&quot; Loop, Adhesive Backed</td>
<td>1</td>
</tr>
</tbody>
</table>

**REVISIONS**

<table>
<thead>
<tr>
<th>ZONE REV.</th>
<th>DESCRIPTION</th>
<th>DATE APPROVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-C4</td>
<td>Added note to reflect update to GE-22324 done to mount ramp at a steeper angle</td>
<td>1/11/2022 CPO</td>
</tr>
</tbody>
</table>

**UNLESS OTHERWISE SPECIFIED:**

**SCALE:** 1:3

**DIMENSIONS ARE IN INCHES**

**TOLERANCES:**

- FRACTIONAL: ±1/16
- ANGULAR: Machined ±1° BEND ±1°
- TWO PLACE DECIMAL: ±0.1
- THREE PLACE DECIMAL: ±0.005

**MATERIAL/FINISH:**

**DO NOT SCALE DRAWING**

**PROPRIETARY AND CONFIDENTIAL**

The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

**COMMENTS:**

- REMOVE ALL BURRS AND SHARP EDGES.
Use lower of 2 holes here.

Notes:
1. Attach 2 to 1 using 3 and 4. Note hole orientation of 1.
2. Clean and prep 1.
3. Attach 5 and 6 to 1 in positions shown.

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR: Mach 1° Bend 1°
TWO PLACE DECIMAL: .01
THREE PLACE DECIMAL: .005

MATERIAL/FINISH:

UNLESS OTHERWISE SPECIFIED:

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22324</td>
<td>Lower Exit Side Polycarbonate</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22337</td>
<td>Lower Exit Ramp Angle with Hook</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>hex_.25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Loop_1_14</td>
<td>1&quot; x 14&quot; Loop, Adhesive Backed</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Loop_1_18</td>
<td>1&quot; x 18&quot; Loop, Adhesive Backed</td>
<td>1</td>
</tr>
</tbody>
</table>

**Revisions**

<table>
<thead>
<tr>
<th>ZONE</th>
<th>REV.</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>APPROVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-B3</td>
<td>A</td>
<td>Added note to reflect update to GE-22324 done to mount ramp at a steeper angle.</td>
<td>1/11/2022</td>
<td>CPO</td>
</tr>
</tbody>
</table>
Use lower of 2 holes here.

Notes:
1. Attach 2 to 1 using 3 and 4. Note hole orientation of 1.

Notes:
1. Clean and prep 1.
2. Attach 5 and 6 to 1 in positions shown.
Notes:
1. Tag or label with part number.
Notes:

1. Make sure surface of 1 is clean prior to hook application.
2. Attach 2 to 1 in locations shown, flush to edges of part.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22328</td>
<td>Lower Exit Front Roof</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Loop_1_18</td>
<td>1&quot; x 18&quot; Loop, Adhesive Backed</td>
<td>2</td>
</tr>
</tbody>
</table>
Notes:
1. Tag or label with part number.
Notes:
1. Make sure surface of 1 is clean prior to hook application.
2. Attach 2 to 1 in locations shown.

ITEM NO. PART NUMBER DESCRIPTION QTY.
1 GE-22330 Lower Exit Front Ramp 1
2 Loop_1_9 1" x 9" Loop, Adhesive Backed 2
Notes:
1. Tag or label with part number.

Dimensions are in inches. Tolerances:
- Fractional: ±1/16
- Angular: Mach +1° Bend +1°
- Two place decimal: ±0.01
- Three place decimal: ±0.005

Material/Finish:
1/4" thick HDPE, natural

UNLESS OTHERWISE SPECIFIED:
- Material/Finish:
- Dimensions are in inches
- Tolerances:
  - Fractional: ±1/16
  - Angular: Mach +1° Bend +1°
  - Two place decimal: ±0.01
  - Three place decimal: ±0.005

Proprietary and Confidential:
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
- Remove all burrs and sharp edges.
- Do not scale drawing.

Title:
Lower Exit HDPE Wall

Drawn: CO 6/11/2021

Size: 1:3

Drawing Number: GE-22332

Scale: 1 of 1
Notes:
1. Tag or label with part number.

ITEM NO. PART NUMBER DESCRIPTION QTY.
1 GE-22333-01 14 Ga. Preplated Steel 1
2 perm_clinchnut_.25_20_.054 1/4-20 self-clinching nut, .054 shank 8

DO NOT SCALE DRAWING
Notes:
1. Tag or label with part number.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22334-01</td>
<td>14 Ga. Preplated Steel</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>perm_clinchnut_25_20_054</td>
<td>1/4-20 self-clinching nut, .054 shank</td>
<td>8</td>
</tr>
</tbody>
</table>
**Notes:**
1. Tag or label with part number.

**DIMENSIONS ARE IN INCHES**

**TOLERANCES:**

- FRACTIONAL: ±1/16
- ANGULAR: Mach ±1° Bend ±1°
- TWO PLACE DECIMAL: ±0.02
- THREE PLACE DECIMAL: ±0.015

**MATERIAL/FINISH:**

- Edge of 7 aligns with face of 2

**PROPRIETARY AND CONFIDENTIAL**

The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

**COMMENTS:**

- Remove all burrs and sharp edges.

---

**ITEM NO.** | **PART NUMBER** | **DESCRIPTION** | **QTY.**
---|---|---|---
1 | GE-22335-01 | 1.75" x .125" thk. Square Tubing, 6061 Aluminum | 2
2 | GE-22335-02 | 1.75" x .125" thk. Square Tubing, 6061 Aluminum | 4
3 | GE-22335-03 | 1.75" x .125" thk. Square Tubing, 6061 Aluminum | 2
4 | GE-22335-04 | 1.75" x .125" thk. Square Tubing, 6061 Aluminum | 4
5 | GE-22335-05 | 1.25" Schedule 40 Pipe, 6061 Aluminum | 2
6 | GE-22335-06 | 1.75" x .125" thk. Square Tubing, 6061 Aluminum | 4
7 | GE-22335-07 | 8 Ga. 5052 Aluminum | 1

**UNLESS OTHERWISE SPECIFIED:**

**SCALE: 1:8**

**DRAWN**

Ge-22335

**DATE:** 7/26/2021

**REVDWG. NO.**

C

**TITLE:** Lower Exit Frame

**NAME**

**WELD**

**CO**

**SIZE**

**DWG. NO.**

**REV.**

Sheet 1 of 3
ITEM NO. | PART NUMBER | DESCRIPTION | QTY.
--- | --- | --- | ---
1 | GE-22335 | Lower Exit Frame | 1
2 | Hook_1_14 | 1" x 14" Hook, Adhesive Backed | 4
3 | Hook_1_18 | 1" x 18" Hook, Adhesive Backed | 4
4 | Hook_2_10 | 2" x 10" Hook, Adhesive Backed | 2
5 | Hook_2_46 | 2" X 46" Hook, Adhesive Backed | 2
Notes:
1. Make sure surface of 1 is clean prior to hook application.
2. Attach 2 and 3 in locations shown.
3. Repeat process for opposite side of weldment.
Notes:
1. Make sure surface of 1 is clean prior to hook application.
2. Attach 2 to 1 in location shown. 2 should be centered along the edge of 1.
Notes:
1. Attach 2 or 3 to 1 using hook and loop.
2. Assembly exists in Vinyl and clear configurations.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22343</td>
<td>Fender Frame with Hook</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22345</td>
<td>Fender Front Polycarbonate with Loop</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>GE-22349</td>
<td>Fender Vinyl Polycarbonate with Loop</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

**Fender Assembly - Clear**

**Fender Assembly - Vinyl**
No weld inside pipes permissible.

Notes:
1. Tag or label with part number.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22342-01</td>
<td>1.75&quot; x .125&quot; tk. Square Tube, 6061 Aluminum</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>GE-22342-02</td>
<td>1.75&quot; x .125&quot; tk. Square Tube, 6061 Aluminum</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>GE-22342-03</td>
<td>1-1/4&quot; Schedule 40 Pipe, 6061 Aluminum</td>
<td>4</td>
</tr>
</tbody>
</table>
UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: ±1° BEND
TWO PLACE DECIMAL: ±.002
THREE PLACE DECIMAL: ±.0015

MATERIAL/FINISH:

DO NOT SCALE DRAWING

SCALE: 1:1
SHEET 2 OF 2

Fender Frame

WELD | NAME | DATE
--- | --- | ---

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DRAWN CO 6/17/2021

C GE-22342

REV

5.38

2x R.83

.13

1.75

1.75

1.75

1.75

1.66

1.38

1.75

1.75

1.75
Notes:
1. Make sure surface of 1 is clean prior to hook application.
2. Attach 2 to 1 in locations shown.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22342</td>
<td>Fender Frame</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Hook_1_36</td>
<td>1&quot; x 36&quot; Hook, Adhesive Backed</td>
<td>2</td>
</tr>
</tbody>
</table>
Notes:
1. Tag or label with part number
2. Vinyl to be applied to face

Material/Finish:
1/4" thk. Polycarbonate, Clear

UNLESS OTHERWISE SPECIFIED:
Dimensions are in inches
Tolerances:
Fractional: ±1/16
Angular: Mach ±1° Bend ±1°
Two place decimal: ±.01
Three place decimal: ±.005

Proprietary and Confidential
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
Remove all burrs and sharp edges.

DO NOT SCALE DRAWING

Title: Fender Front
Polycarbonate

VEND: KAMC
NAME: KAMC
DATE: 6/11/2021

Scale: 1:5
Sheet 1 of 1

First Robotics Competition

GE-22344
Notes:
1. Make sure surface of 1 is clean prior to loop application.
2. Attach 2 to 1 in locations shown.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22344</td>
<td>Fender Front Polycarbonate</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Loop_1_36</td>
<td>1&quot; x 36&quot; Loop, Adhesive Backed</td>
<td>2</td>
</tr>
</tbody>
</table>

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR, MACH: ±1° BEND: ±1°
TWO PLACE DECIMAL: ±.01
THREE PLACE DECIMAL: ±.005

MATERIAL/FINISH:

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DRAWN: CO 11/3/2021

SCALE: 1:5
SHEET 1 OF 1
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22347</td>
<td>Fender Pipe</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>pin_25_2.375_wireloc_kclevis</td>
<td>Wire-Lock Clevis Pin</td>
<td>1</td>
</tr>
</tbody>
</table>

**UNLESS OTHERWISE SPECIFIED:**

- **SCALE:** 1:2
- **DRAWN:** KAMC 7/7/2021
- **MATERIAL/FINISH:**
- **DIMENSIONS ARE IN INCHES**
- **TOLERANCES:**
  - FRACTIONAL: ±1/16
  - ANGULAR: MACH ±1° BEND
  - TWO PLACE DECIMAL: ±.01
  - THREE PLACE DECIMAL: ±.005

**DO NOT SCALE DRAWING**

**PROPRIETARY AND CONFIDENTIAL**

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

**COMMENTS:**
- REMOVE ALL BURRS AND SHARP EDGES.
Pin clip position may vary
Vinyl applied to one face. Front and back of part are identical.

Trim vinyl at hole locations 8 places

Notes:
1. Tag or label with part number
2. Standard vinyl (not mesh)
Notes:
1. Make sure surface of 1 is clean prior to loop application.
2. Attach 2 to 1 in locations shown. 2 should be attached on side of 1 without vinyl.
Notes:
1. Attach 7 to 5 as shown using 8 and 9.
Notes:
1. Attach 3 and 2 to each 1 using 120 lb. cable ties.
2. Insert all 6 into the assembly, bending into place and aligning with the hooks on 1.
3. Cable tie 6 to 2 and 3.
Notes:
1. Attach 4 to 1 using 10 as shown.
2. Attach 4 to 6 using 11 as shown.
## EXPLODED VIEW:

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>rivet, 3/16&quot; grip range 1/25&quot;</td>
<td>3/16&quot; Rivet, .126-.25 Grip Range</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>GE-22352-01</td>
<td>Ring Support Left Side</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22352-02</td>
<td>Ring Support Right Side</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22352-03</td>
<td>Ring Support Back</td>
<td>1</td>
</tr>
</tbody>
</table>

Rivets should be plated or stainless steel. Tag or label with part number.

**Lower Hub Ring Support Assembly**

**VENDOR**: KAMC  
**DRAWN**: KAMC  
**DATE**: 6/16/2021

**PROPRIETARY AND CONFIDENTIAL**: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

**COMMENTS**: REMOVE ALL BURRS AND SHARP EDGES.

**DO NOT SCALE DRAWING**

**TOLERANCES**:
- Fractional: ±1/16
- Angular Mach: ±1° Bend
- Two Place Decimal: ±.01
- Three Place Decimal: ±.005

**MATERIAL/FINISH**: Rivets should be plated or stainless steel. Tag or label with part number.

**DIMENSIONS ARE IN INCHES**

**SCALE**: 1:4

**SHEET**: 1 OF 2
Rivets should be plated or stainless steel. Tag or label with part number.
UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: ±1°
THREE PLACE DECIMAL: ±0.010
TWO PLACE DECIMAL: ±0.005

MATERIAL/FINISH:
14 Gauge Pre-Plated Steel

DO NOT SCALE DRAWING

RING SUPPORT
RIGHT SIDE

Note: This part is a mirror of GE-22352-01
Notes:
1. Tag or label with part number

- Diameter: 0.6375 in
- Wall Thickness: 0.125 in
- Material: 6061 Aluminum, Round Tube
- 2" diameter x 0.125" wall, 6061 Aluminum, Round Tube
- Scale: 1:12
- Section A-A

UNLESS OTHERWISE SPECIFIED:
- DIMENSIONS ARE IN INCHES
- TOLERANCES:
  - FRACTIONAL: ±1/16
  - ANGULAR: MACH ±1° BEND ±1°
  - TWO PLACE DECIMAL: ±0.02
  - THREE PLACE DECIMAL: ±0.015

MATERIAL/FINISH:
- 2" diameter x 0.125" wall, 6061 Aluminum, Round Tube

COMMENTS:
- REMOVE ALL BURRS AND SHARP EDGES.
- DO NOT SCALE DRAWING

TITLE: Lower Hub Top Ring

DRAWN: KAMC 12/11/2020

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.
Notes:
1. Tag or label with part number

2" diameter x .125" wall, 6061 Aluminum, Round Tube

Lower Hub
Bottom Ring

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: \( \pm \frac{1}{16} \)
ANGULAR: MACH 1° BEND: \( \pm \frac{1}{16} \)
TWO PLACE DECIMAL: \( \pm \frac{1}{100} \)
THREE PLACE DECIMAL: \( \pm \frac{1}{1000} \)

MATERIAL/FINISH:
2" diameter x .125" wall, 6061 Aluminum, Round Tube

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.
Description: CHAINBOSS Plastic Chain: US Weight 2 in., Black
Vendor: The Home Depot
Part Number: [internet] 315968945

Substitutions allowed with permission from FIRST HQ.
Note: Description, Vendor, and Part Number from GE-22355 applicable to GE-22355-01
### Notes:
1. Tag or label with part number.

### Item 1
- **Part Number:** GE-22356-01
- **Description:** 14 Gauge A-366/1008 Cold Roll Steel
- **Quantity:** 1

### Item 2
- **Part Number:** GE-22356-02
- **Description:** 1" Schedule 40 A500 Steel
- **Quantity:** 4

### Title:
Lower Hub Base

### Scale:
1:5

### Sheet:
1 of 3

---

**UNLESS OTHERWISE SPECIFIED:**

- **Scale:** 1:5
- **Drawn:** CO 7/22/2021

**DIMENSIONS ARE IN INCHES**

**TOLERANCES:**
- Fractional: ±1/16
- Angular: ±1° bend
- Two Place Decimal: ±0.02
- Three Place Decimal: ±0.015

**MATERIAL/FINISH:**
- Powder Coat Black

**COMMENTS:**
- Remove all burrs and sharp edges.

**WELD**

**NAME**

**DATE**

**DRAWN**

**REV**

**SIZE**

**DWG. NO.**

**C**

**GE-22356**

**SHEET 1 OF 3**

---

**PROPRIETARY AND CONFIDENTIAL**

The information contained in this drawing is the sole property of First®. Any reproduction in part or as a whole without the written permission of First® is prohibited.
Bottom of two assemblies coincident.

Notes:
1. For reference only: designed interface of GE-22356 with mating part.
Notes:
1. Attach 2 to 1 using 4 and 3.

ITEM NO. | PART NUMBER | DESCRIPTION |
---------|-------------|-------------|
1        | GE-22382    | Upright Top |
2        | GE-22383    | Upright Bottom |
3        | hex_25_20_0.75 | Steel Hex Head Screw, 1/4"-20 x 0.75", fully threaded |
4        | nylock_25_20 | Steel Nylon-Insert Locknut, 1/4"-20 |
Notes:
1. Tag or label with part number

2X TRUE R1.00

Tag or label with part number.
NOTE:
1. Tag or label with part number

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet
Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL: ±.02
THREE PLACE DECIMAL: ±.010

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.
Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:
- DIMENSIONS ARE IN INCHES
- TOLERANCES: FRACTIONAL ±1/16
- ANGULAR: MACH ±1° BEND ±1°
- TWO PLACE DECIMAL ±.002
- THREE PLACE DECIMAL ±.0005

MATERIAL/FINISH:
- 1/8" 5052 Aluminum Sheet

DO NOT SCALE DRAWING

REFERENCE: FIRST®
- ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
- REMOVE ALL BURRS AND SHARP EDGES.

TITLE: Leg to Upper Exit Gusset Right

SIZE: C
Dwg. No.: GE-22377
Scale: 1:3
Sheet: 1 of 1

Drawing Date: 7/6/2021
KMC
Rev.
Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH ±1° BEND ±10°
TWO PLACE DECIMAL: ±.005
THREE PLACE DECIMAL: ±.001

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH ±1° BEND ±10°
TWO PLACE DECIMAL: ±.005
THREE PLACE DECIMAL: ±.001

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING
Note: 2 installed on “inside” of part

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22379-01</td>
<td>Leg to Upper Exit Channel</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>pem_clinchnut_25_20_054</td>
<td>1/4-20 self-clinching nut, .054 shank</td>
<td>8</td>
</tr>
</tbody>
</table>

**Title:**
Leg to Upper Exit Channel with Pem Nuts

**Scale:** 1:3

**Sheet:** 1 of 2

**Drawn:** KAMC 7/6/2021

**Material/Finish:**
Tag or label with part number

**Tolerances:**
- Fractional: \( \frac{1}{16} \)
- Angular: Mach \( 1° \)
- Bend: \( 1° \)
- Two Place Decimal: \( 0.01 \)
- Three Place Decimal: \( 0.005 \)

**Comments:**
- Remove all burrs and sharp edges.

**Proprietary and Confidential:**
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.
Install Pem Nuts on "inside" of part

Tag or label with part number

Material/Finish:
Tag or label with part number

Comments:
Remove all burrs and sharp edges.

UNLESS OTHERWISE SPECIFIED:
Dimensions are in inches.
Tolerances:
Fractional: 1/16
Angular, Mach: 1° bend
Two place decimal: 0.01
Three place decimal: 0.005

Title:
Leg to Upper Exit Channel with Pem Nuts

Drawn:
KAMC
7/6/2021

Proprietary and Confidential:
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
Remove all burrs and sharp edges.
Notes:
1. Tag or label with part number
### Notes:
1. Tag or label with part number

### Table

<table>
<thead>
<tr>
<th>Notes</th>
<th>Materials/Finish</th>
<th>Scale: 1:1</th>
<th>Sheet: 1 of 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8&quot; 5052 Aluminum Sheet</td>
<td>UNLESS OTHERWISE SPECIFIED:</td>
<td>DO NOT SCALE DRAWING</td>
<td>PROPRIETARY AND CONFIDENTIAL</td>
</tr>
<tr>
<td>PROPRIETARY AND CONFIDENTIAL</td>
<td>DIMENSIONS ARE IN INCHES</td>
<td>THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.</td>
<td></td>
</tr>
<tr>
<td>TOLERANCES:</td>
<td>FRACTIONAL: 1/16</td>
<td>MATERIAL/FINISH:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ANGULAR, MACH: 1° BEND</td>
<td>1/8&quot; 5052 Aluminum Sheet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>THREE PLACE DECIMAL: 0.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWO PLACE DECIMAL: 0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEND</td>
<td>NAME</td>
<td>DATE</td>
<td></td>
</tr>
<tr>
<td>DO NOT SCALE DRAWING</td>
<td>DRAWN</td>
<td>KAMC</td>
<td>7/6/2021</td>
</tr>
<tr>
<td>COMMENTS:</td>
<td>REMOVE ALL BURRS AND SHARP EDGES.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Drawing Title:
Leg to Upper Hub Connection Right

#### Drawing Scale:
1:1

#### Drawing Number:
GE-22380

#### Drawing Sheet:
1 of 1
Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL ±.001
THREE PLACE DECIMAL ±.0001

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING
Notes:
1. Attach 1 and 2 to 3 using 6 and 7.
2. Attach 4 and 5 to 3 using 6.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22377</td>
<td>Leg to Upper Exit Gusset Right</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22378</td>
<td>Leg to Upper Exit Gusset Left</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22379</td>
<td>Leg to Upper Exit Channel with Pem Nuts</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22380</td>
<td>Leg to Upper Hub Connection Right</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>GE-22381</td>
<td>Leg to Upper Hub Connection Left</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>hex_25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; lang, fully threaded</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>nylock_25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>4</td>
</tr>
<tr>
<td>ITEM NO.</td>
<td>PART NUMBER</td>
<td>DESCRIPTION</td>
<td>QTY.</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>GE-22372</td>
<td>Leg Base</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22373</td>
<td>Leg Support Bracket Right</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>GE-22374</td>
<td>Leg Support Bracket Left</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>GE-22375</td>
<td>Leg Vertical Channel</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>nylock_25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>hex_25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>14</td>
</tr>
</tbody>
</table>

**UNLESS OTHERWISE SPECIFIED:**

- **SCALE:** 1:4
- **DRAWN:** CO 12/29/2021
- **TITLE:** Upright Bottom
- **DATE:** 12/29/2021

**PROPRIETARY AND CONFIDENTIAL**

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

**DIMENSIONS ARE IN INCHES**

- **TOLERANCES:**
  - FRACTIONAL: ±1/16
  - ANGULAR: MACH. ±1° BEND ±1/16
  - TWO PLACE DECIMAL: ±0.01
  - THREE PLACE DECIMAL: ±0.005

**MATERIAL/FINISH:**

- **DO NOT SCALE DRAWING**
- **COMMENTS:** REMOVE ALL BURRS AND SHARP EDGES.
Notes:
1. Attach 2 and 3 to 1 using 6 and 5.

Notes:
1. Attach 4 to assembly using 5 and 6 to connect to 2 and 3 as shown.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22392</td>
<td>Horn</td>
</tr>
<tr>
<td>2</td>
<td>GE-22393</td>
<td>Horn Bounce Plate</td>
</tr>
<tr>
<td>3</td>
<td>GE-22398</td>
<td>Upper Exit Sensor Wall</td>
</tr>
<tr>
<td>4</td>
<td>GE-22399</td>
<td>Upper Exit Top with Pem Nuts</td>
</tr>
<tr>
<td>5</td>
<td>GE-22400</td>
<td>Upper Exit Side Wall</td>
</tr>
<tr>
<td>6</td>
<td>GE-22406</td>
<td>Upper Exit Sheet Metal with Foam</td>
</tr>
<tr>
<td>7</td>
<td>hex_.25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
</tr>
<tr>
<td>8</td>
<td>washer_flat_.25</td>
<td>Flat Washer for 1/4&quot; Screw</td>
</tr>
</tbody>
</table>

Exploded View

**LEGEND**
- Exploded View
- Assembly

**NOTES**
- DO NOT SCALE DRAWING
- SHEET 1 OF 2

**DIMENSIONS ARE IN INCHES**
- TOLERANCES:
  - FRACTIONAL: ±1/16
  - ANGULAR: ±1°
  - BEND: ±1°
  - TWO PLACE DECIMAL: ±0.01
  - THREE PLACE DECIMAL: ±0.005

**MATERIAL/FINISH:**
- Tag or label with part number

**UNLESS OTHERWISE SPECIFIED:**
- SCALE: 1:8
- REVISED: 7/6/2021

**VENDOR:**
- KAMC

**NAME:**
- DRAWN: 7/6/2021

**PROPRIETARY AND CONFIDENTIAL:**
- THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

**COMMENTS:**
- REMOVE ALL BURRS AND SHARP EDGES.
Exploded View:

Note: PEM NUTS INSTALLED ON "INSIDE" OF PART

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22399-01</td>
<td>Upper Exit Top</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>pem_clinchnut_.25_20_.054</td>
<td>1/4-20 self-clinching nut, .054 shank</td>
<td>8</td>
</tr>
</tbody>
</table>
10.00
R.13
6X R.19
4X Ø .34 THRU ALL
(1/4-20 PEM NUT HOLE)
4.50 to false sharp

.25 to center of slot

4X .25

R4.00

R.25 X .50 THRU ALL

Notes:
1. Tag or label with part number

Upper Exit Side Wall

Notes:
1. Tag or label with part number

Material/Finish:
1/4" Poly, Clear

Tolerances:
Fractional: 1/16
Angular: Mach 1° Bend: 1°

Two Place Decimal: .01
Three Place Decimal: .005

Do Not Scale Drawing

Proprietary and Confidential

The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
Remove all burrs and sharp edges.
DESCRIPTION: U SHAPE EDGE PROTECTORS
VENDOR: M2CBRIDGE VIA AMAZON
COLOR: BLACK
PACKAGE QUANTITY: 1 - 6.5 FEET
NOTES:
1. SUBSTITUTIONS ALLOWED
2. CUT TO LENGTH
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22394</td>
<td>Upper Exit with Pem Nuts</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22395</td>
<td>Upper Exit Base Channel with Pem Nuts</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22397</td>
<td>Upper Exit to Leg Connection Left</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22396</td>
<td>Upper Exit to Leg Connection Right</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>rivet_1''-.25</td>
<td>3/16'' Rivet, .126-.25 Grip Range</td>
<td>33</td>
</tr>
</tbody>
</table>

**Tags or label with part number**

**Upper Exit Riveted Assembly**

**DO NOT SCALE DRAWING**

**UNLESS OTHERWISE SPECIFIED:**

- **SCALE:** 1:6

**DIMENSIONS ARE IN INCHES**

- **TOLERANCES:**
  - FRACTIONAL: ±1/16
  - ANGULAR: MACH ±1° BEND
  - TWO PLACE DECIMAL: ±.01
  - THREE PLACE DECIMAL: ±.005

**MATERIAL/FINISH:**

- Tag or label with part number

**PROPRIETARY AND CONFIDENTIAL:**

- The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

**COMMENTS:**

- REMOVE ALL BURRS AND SHARP EDGES.
Exploded View:

**Item No.** | **Part Number** | **Description** | **QTY.**
--- | --- | --- | ---
1 | GE-22394-01 | Upper Exit Exit | 1
2 | pem_clinchnut_.25_20_.054 | 1/4-20 self-clinching nut, .054 shank | 6

**Tag or label with part number**

**Upper Exit Exit with Pem Nuts**

**Proprietary and Confidential**

The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

**Comments:**

Remove all burrs and sharp edges.

**Do not scale drawing.**

**Scale:** 1:4

**Rev:** C

**Material/Finish:**

Tag or label with part number

**Dimensions are in inches.**

**Tolerances:**

Fractional: ±1/16

Angular, Mach 1°: 1° bend, ±1°

Two Place Decimal: ±0.01

Three Place Decimal: ±0.005

**Unless otherwise specified:**

**Drawn by:** KAMC

7/6/2021

**Title:** Upper Exit Exit with Pem Nuts

**Drawing:** GE-22394

Sheet 1 of 2
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22395-01</td>
<td>Upper Exit Base Channel</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>pem_clinchnut_25_20_054</td>
<td>1/4-20 self-clinching nut, .054 shank</td>
<td>12</td>
</tr>
</tbody>
</table>

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:
- SCALE: 1:4

MATERIAL/FINISH:
- Tag or label with part number

COMMENTS:
- REMOVE ALL BURRS AND SHARP EDGES.

DIMENSIONS ARE IN INCHES
- TOLERANCES:
  - FRACTIONAL: ±1/16
  - ANGULAR, MACH: ±1° BEND
  - TWO PLACE DECIMAL: ±0.01
  - THREE PLACE DECIMAL: ±0.005

PROPRIETARY AND CONFIDENTIAL
- THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST IS PROHIBITED.
Upper Exit Base Channel with PEM Nuts

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:
- FRACTIONAL: ±1/16
- ANGULAR, MACH: ±1° BEND
- TWO PLACE DECIMAL: ±0.01
- THREE PLACE DECIMAL: ±0.005

MATERIAL/FINISH:
- Tag or label with part number

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
- THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
- REMOVE ALL BURRS AND SHARP EDGES.
Upper Exit Base Channel

Dimensions are in inches.

Tolerances:
- Fractional: ±1/16
- Angular, Machined: ±1°
- Two Place Decimal: ±0.02
- Three Place Decimal: ±0.010

Material/Finish:
1/8" 5052 Aluminum Sheet

Proprietary and Confidential:
The information contained in this drawing is the sole property of First Robotics. Any reproduction in part or as a whole without the written permission of First Robotics is prohibited.

Comments:
Remove all burrs and sharp edges.

Unless otherwise specified:
Scale: 1:4
Sheet 1 of 1
Note:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH: ±1° BEND: ±1/8
THREE PLACE DECIMAL: ±0.005
TWO PLACE DECIMAL: ±0.02

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

DO NOT SCALE DRAWING

TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH: ±1° BEND: ±1/8
THREE PLACE DECIMAL: ±0.005
TWO PLACE DECIMAL: ±0.02

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

DO NOT SCALE DRAWING

Proprietary and confidential
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
Remove all burrs and sharp edges.

Tag or label with part number
UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: ±1°
TWO PLACE DECIMAL: ±0.02
THREE PLACE DECIMAL: ±0.010

MATERIAL/FINISH:
1/8" 5052 Aluminum Sheet

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

Note:
1. Tag or label with part number

TITLE:
Upper Exit to Leg Connection Left

SIZE
DWG. NO.
REV

SCALE: 1:4
SHEET 1 OF 2
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22413</td>
<td>Upper Hub Baseplate Assembly</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22414</td>
<td>Upper Hub Vertical Rib</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>GE-22416</td>
<td>Upper Hub Large Rib Assembly</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>GE-22418</td>
<td>Upper Hub Small Rib Assembly</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>GE-22419</td>
<td>Upper Hub Panel</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>GE-22420</td>
<td>Upper Hub Vision Assembly</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>GE-22432</td>
<td>High Agitator Assembly</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>hex_.25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>hex_.25_20_1.25_partial</td>
<td>Steel Hex Head Bolt, 1/4&quot;-20 x 1.25&quot;, partially threaded</td>
<td>36</td>
</tr>
<tr>
<td>10</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>40</td>
</tr>
<tr>
<td>11</td>
<td>washer_flat_.25</td>
<td>Flat Washer for 1/4&quot; Screw</td>
<td>12</td>
</tr>
</tbody>
</table>
Notes:
1. Attach 3 to the assembly using 9 and 10.
Notes:
1. Attach 4 to assembly using 9 and 10.

Notes:
1. Insert all 5 into the assembly, bending and aligning with the hooks on 2.
2. Cable tie 5 to 2, 3, and 4.
Notes:
1. Attach 6 to assembly using 9, 11, and 10 as shown.
2. Cable tie adjacent 6's to each other and 2.

Notes:
1. Attach 7 to assembly using 8 and 10.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/2
ANGULAR: MACH 1° BEND ±1°
TWO PLACE DECIMAL: ±.005

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

MATERIAL/FINISH:

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

TITLE: Upper Hub

SIZE: 1:6 SHEET 4 OF 4
Notes:
1. Attach 1 to 2 using 3 and 4.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22301</td>
<td>Hub Angle Bracket</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>GE-22412</td>
<td>Upper Hub Baseplate</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>hex_.25_20_0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot; long, fully threaded</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>16</td>
</tr>
</tbody>
</table>
8X Ø .27 THRU ALL

116.75°

27.18

17.73

8X R.05

3.00

2.41

3.66

4.34

8.91

10.18

14.47

17.72

18.53

18.97

17.47

17.74

A

B

C

D

Upper Hub
Vertical Rib

1/2" HDPE, natural/smooth

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL: 1/16

ANGULAR: MACH 1° BEND 1/8

TWO PLACE DECIMAL: .01

THREE PLACE DECIMAL: 0.005

MATERIAL/FINISH:

1/2" HDPE, natural/smooth

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

DRAWN: CO

6/28/2021

SCALE: 1:4

SHET 1 OF 1

VEND

NAME

DATE

REV

FOUR ROBOTICS COMPETITION

GE-22414

SIZE

DWG. NO.

TITLE

SCALE

REMARKS

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL: 1/16

ANGULAR: MACH 1° BEND 1/8

TWO PLACE DECIMAL: .01

THREE PLACE DECIMAL: .005

MATERIAL/FINISH:

1/2" HDPE, natural/smooth

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.
Notes:
1. Attach 1 to 2 using 3 and 4.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22301</td>
<td>Hub Angle Backet</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>GE-22415</td>
<td>Upper Hub Large Rib</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>hex_.25_20_1.25_parti</td>
<td>Steel Hex Head Bolt, 1/4-20 x 1.25&quot;, partially threaded</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>4</td>
</tr>
</tbody>
</table>
Details:

1. Tag or label with part number.

Notes:

1/2" HDPE, natural/smooth

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH 1° BEND ±1°
TWO PLACE DECIMAL: ±0.01
THREE PLACE DECIMAL: ±0.005

MATERIAL/finish:
1/2" HDPE, natural/smooth

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

DO NOT SCALE DRAWING
Notes:
1. Attach 1 to 2 using 3 and 4.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22301</td>
<td>Hub Angle Bracket</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>GE-22417</td>
<td>Upper Hub Small Rib</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>hex_25_20_1_25_parti</td>
<td>Steel Hex Head Bolt. 1/4-20 x 1.25”, partially threaded</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>nylock_25_20</td>
<td>Steel Nylon-Insert Locknut. 1/4-20</td>
<td>4</td>
</tr>
</tbody>
</table>
Notes:
1. Tag or label with part number.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22421</td>
<td>Upper Hub Vision Plastic</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22422</td>
<td>Upper Hub Vision Angle</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>hex_.25_20 .0.75</td>
<td>Steel Hex Head Screw, 1/4&quot;-20 x 0.75&quot;, fully threaded</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>tape_VISIONTARGET</td>
<td>2&quot; Wide, 5&quot; Long 3M 8830 Scotchlite Reflective Material</td>
<td>4</td>
</tr>
</tbody>
</table>
Notes:
1. Attach 5 to 1 in locations shown.

Notes:
1. Attach 2 to 1 using 3 and 4.
Notes:
1. Tag or label with part number.

Dimensions are in inches.
Tolerances:
- Fractional: ±1/16
- Angular, Mach: ±1° bend
- Two place decimal: ±0.01
- Three place decimal: ±0.005

Material/Finish:
1/8" thick, Polycarbonate, Clear

Proprietary and Confidential
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
- Remove all burrs and sharp edges.

Scale: 2:3

Sheet 1 of 1

UNLESS OTHERWISE SPECIFIED:
- DIMENSIONS ARE IN INCHES
- TOLERANCES:
  - FRACTIONAL: ±1/16
  - ANGULAR, MACH: ±1° BEND
  - TWO PLACE DECIMAL: ±0.01
  - THREE PLACE DECIMAL: ±0.005
- MATERIAL/FINISH:
  - 1/8" thick, Polycarbonate, Clear
- PROPRIETARY AND CONFIDENTIAL
  - THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.
- COMMENTS:
  - REMOVE ALL BURRS AND SHARP EDGES.

Scale: 2:3

Sheet 1 of 1

UNLESS OTHERWISE SPECIFIED:
- Dimensions are in inches.
- Tolerances:
  - Fractional: ±1/16
  - Angular, Mach: ±1° bend
  - Two place decimal: ±0.01
  - Three place decimal: ±0.005
- Material/Finish:
  - 1/8" thick, Polycarbonate, Clear
- Proprietary and Confidential
  - The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.
- Comments:
  - Remove all burrs and sharp edges.

Scale: 2:3

Sheet 1 of 1
Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL: ±0.02
THREE PLACE DECIMAL: ±0.010

MATERIAL/FINISH:
14 Ga. preplated steel

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING
Notes:
1. Mount 1 on the exposed hex shaft of 2.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22433</td>
<td>Low Agitator Wheel Assembly</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>GE-22450</td>
<td>Low Agitator Drive Assembly</td>
<td>1</td>
</tr>
<tr>
<td>ITEM NO.</td>
<td>PART NUMBER</td>
<td>DESCRIPTION</td>
<td>QTY.</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>1</td>
<td>GE-22437</td>
<td>1/2 in. Hex Bearing</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>GE-22438</td>
<td>1/2 in. Hex Shaft Collar</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22439</td>
<td>609 9mm wide 5mm HTD belt</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22440</td>
<td>24 tooth 5mm HTD hex bore pulley</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>GE-22441-012</td>
<td>12T CIM Sport Gearbox with CIM</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>GE-22442</td>
<td>Agitator Baseplate</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>GE-22443</td>
<td>Agitator Gearbox Auxiliary Plate</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>GE-22444</td>
<td>Agitator Output Shaft Auxiliary</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>GE-22445-125</td>
<td>1/2 in. hex molded spacer, 1/8 in.</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>GE-22445-1000</td>
<td>1/2 in. hex molded spacer, 1 in.</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>GE-22447</td>
<td>High Agitator Wheel with Hub</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>GE-22448</td>
<td>High Agitator Drive Hex Shaft</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>hex_.25_20_1.5_partial</td>
<td>Steel Hex Head Screw, 1/4&quot; x 1&quot;</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>hex_.25_20_2.75_partial</td>
<td>Steel Hex Head Screw, 3/4&quot; x 2&quot;</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;</td>
<td>7</td>
</tr>
<tr>
<td>16</td>
<td>socket_hex_.10_.32_.5_nylon</td>
<td>Socket Head Screw, 10-32 x 0.5&quot;</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>spacer_.252_.625_.875</td>
<td>Spacers, 252 ID, .625 OD, .875 long</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>spacer_.255_.625_2</td>
<td>Spacers, 255 ID, .625 OD, 2 long</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>washer_flat_10_oversized</td>
<td>Oversized flat Washer for #10 Screw</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>GE-22445-375</td>
<td>1/2 in. hex molded spacer, 3/8 in.</td>
<td>2</td>
</tr>
</tbody>
</table>

**REVISIONS**

<table>
<thead>
<tr>
<th>ZONE</th>
<th>REV.</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>APPROVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3-A4</td>
<td>Added notes for use of glue on pulleys, updates made to geometry of GE-22442, GE-22443, GE-22444</td>
<td>8/17/2021</td>
<td>CPO</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>Two fasteners changed from hex head to socket head bolts.</td>
<td>10/27/2021</td>
<td>CPO</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>Changed fasteners back to hex head. Changed length of bolts and spacers to reduce wheel height. Spacers added to capture extra hex shaft. Assembly instructions modified to include new spacers.</td>
<td>11/23/2021</td>
<td>CPO</td>
</tr>
</tbody>
</table>

**High Agitator Assembly**

**DRAWN** CO 6/25/2021

**NAME**

**DATE**

**PREPARED FOR**

**TITLE** High Agitator Assembly

**SIZE** GE-22432

**REV** C

**SCALE** 1:3

**SHEET** 1 OF 4

**UNLESS OTHERWISE SPECIFIED:**

**DIMENSIONS ARE IN INCHES**

**TOLERANCES:**

FRACTIONAL: ± 1/16

ANGULAR: MACH: ±1°

BEND: ±1°

TWO PLACE DECIMAL: ± .01

THREE PLACE DECIMAL: ± .005

**MATERIAL/FINISH:**

**PROPRIETARY AND CONFIDENTIAL**

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

**DO NOT SCALE DRAWING**
If bearing is to be pressed in before this step of assembly, bearing flange should be on opposite face.

Use a few drops of cyanoacrylate glue to bond halves of 4 together.

Notes:
1. Attach 5 to 6 using 16.
2. Slide 9 and 4 in order onto the shaft of 5.
3. Place 3 on 4.

Ensure belt is wrapped around pulley and is not wrapped around any of the spacers.

Notes:
1. Insert or press 1 into 7.
2. Slide 17 onto the shaft of 5, noting flange orientation.
3. Attach 1 and 15 to the assembly using 17 to space the plates and 13 to fasten. Be careful of belt routing.

Dimensions are in inches. Tolerances:
- Fractional: ±1/16
- Angular: Mach ±1° Bend ±1°
- Two place decimal: ±0.01
- Three place decimal: ±0.005

Material/Finish:

Title: High Agitator Assembly

UNLESS OTHERWISE SPECIFIED:

Proprietary and Confidential

The information contained in this drawing is the sole property of FIRST. Any reproduction in part or as a whole without the written permission of FIRST is prohibited.

Comments: Remove all burrs and sharp edges.
Notes:
1. If not already done, press or insert 1 into 6, noting flange orientation.
2. Slide items 2 and 9 onto 12, being careful of order.
3. Slide shaft into place, aligning 3 onto 4, then aligning 12 with 1.
4. Slide 20 (qty 2) onto 12.
5. Attach 16 and 19 to 12. 19 must be large enough diameter to prevent shaft being pulled past spacer.
6. With 20 flush to each other and 1, 12 flush to the bottom of 20, and 2, 4, 9 all flush to each other and 1, tighten set screw on 2.

Use a few drops of cyanoacrylate glue to bond halves of 4 together.

Notes:
1. Insert or press 1 into 8.
2. Slide 1 onto the shaft 12, noting flange orientation.
3. Attach 1 to the assembly using 18 to space the plates and 14 and 15 to fasten.

A
B
C
D

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

1. Insert or press 1 into 8.
2. Slide 1 onto the shaft 12, noting flange orientation.
3. Attach 1 to the assembly using 18 to space the plates and 14 and 15 to fasten.

Use a few drops of cyanoacrylate glue to bond halves of 4 together.
Notes:
1. Slide 10 x 2 onto 12.
2. Slide 11 onto 12, noting wheel orientation.
3. Fasten using 19 and 16. 19 must be large enough diameter to prevent shaft being pulled past hub.
Notes:
1. Attach 2 to 1 using 4, 5, and 6.
2. Attach the previous step to 3 using 4, 5, and 6. Tabs on 2 should insert into slots in 3.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22301</td>
<td>Hub Angle Bracket</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>GE-22435</td>
<td>Low Agitator Triangle</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>GE-22451</td>
<td>Low Agitator Wheel Base Assembly</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>hex_25_20,1.25_partial</td>
<td>Steel Hex Head Bolt, 1/4-20 x 1.25&quot;, partially threaded</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>nylock_25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>washer_flat_25</td>
<td>Flat Washer for 1/4&quot; Screw</td>
<td>20</td>
</tr>
</tbody>
</table>
Description: Hex Hub
Vendor: AndyMark
Part Number: am-4124
Notes:
1. Description: 1/2 in. flanged hex bearing
2. Source: AndyMark
3. Item #: am-29863
4. Equivalent substitutions allowed
Notes:
1. Description: 1/2 in. Hex HD Split Collar Clamp
2. Source: AndyMark
3. Item #: am-1526
4. Equivalent substitutions allowed
Notes:
1. Description: 60 tooth, 9mm wide, 300 mm long, 5mm HTD timing belt.
2. Source: Gates.
3. Item #: 300-5M-09.
4. Equivalent substitutions allowed.
Use a few drops of cyanoacrylate glue to bond halves together.
CIM motor to have Anderson PowerPole connectors installed.

Notes:
1. Fasteners should be installed with loctite or other threadlocker.
2. Source: AndyMark
3X φ .27 THRU ALL

R1.75

1.1249 THRU hole for .5 in. hex bearing

φ2.00 bolt circle

4X φ .20 THRU ALL

2x R.38

2.88

1.75

4.07°

1.35

2x 1.38

.13

3.70

1/8 thk. 5052 Aluminum Sheet

Agitator Gearbox
Auxiliary Plate

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.
Notes:
1. Source: AndyMark
2. Equivalent substitutions allowed

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Manufacturer PN</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE-22445-125</td>
<td>1/2 in. hex molding spacer, 1/8 in. long</td>
<td>am-3948-125</td>
</tr>
<tr>
<td>GE-22445-375</td>
<td>1/2 in. hex molding spacer, 3/8 in. long</td>
<td>am-3948-375</td>
</tr>
<tr>
<td>GE-22445-1000</td>
<td>1/2 in. hex molding spacer, 1 in. long</td>
<td>am-3948-1000</td>
</tr>
</tbody>
</table>
Notes:
1. Description: 8 in. Pneumatic Wheel Kit
2. Source: AndyMark
3. Item #: am-0970
4. Equivalent substitutions allowed
High Agitator Wheel with Hub

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22436</td>
<td>AndyMark 1/2 in. Hex Hub</td>
</tr>
<tr>
<td>2</td>
<td>GE-22446</td>
<td>8 in. Pneumatic Wheel</td>
</tr>
<tr>
<td>3</td>
<td>nylock_10_32</td>
<td>Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size</td>
</tr>
<tr>
<td>4</td>
<td>socket_hex_10_32_2_partial</td>
<td>Socket Head Screw, 10-32 x 2' long, partially threaded</td>
</tr>
</tbody>
</table>

Pneumatic wheel inlet on opposite face as hub is mounted to.
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GE-22437</td>
<td>1/2 in. Hex Bearing</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>GE-22438</td>
<td>1/2 in. Hex Shaft Collar</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>GE-22439</td>
<td>609 9mm wide 5mm HTD belt</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22440</td>
<td>24 tooth 5mm HTD hex bore pulley</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>GE-22441-080</td>
<td>80:1 CIM Sport Gearbox with CIM Motor</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>GE-22442</td>
<td>Agitator Baseplate</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>GE-22443</td>
<td>Agitator Gearbox Auxiliary Plate</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>GE-22444</td>
<td>Agitator Output Shaft Auxiliary Plate</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>GE-22445-125</td>
<td>1/2 in. hex molded spacer, 1/8 in. long</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>GE-22449</td>
<td>Low Agitator Drive Hex Shaft</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>socket_hex_.25_20_1.5_partial</td>
<td>Socket Head Screw, 1/4-20 x 1.5&quot; long, partially threaded</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>socket_hex_.25_20_2.5_partial</td>
<td>Socket Head Screw, 1/4-20 x 2.5&quot; long, partially threaded</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>nylock_.25_20</td>
<td>Steel Nylon-Insert Locknut, 1/4&quot;-20</td>
<td>7</td>
</tr>
<tr>
<td>14</td>
<td>socket_hex_10_32_.5_nylon</td>
<td>Socket Head Screw, 10-32 x 0.5&quot; long, with nylon patch</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>spacer_252_.625_1.75</td>
<td>Spacer, 252 ID, .625 OD, 1.75 long</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>spacer_252_.625_.875</td>
<td>Spacer, 252 ID, .625 OD, .875 long</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>washer_flat_10_oversized</td>
<td>Oversized flat Washer for #10 Screw</td>
<td>1</td>
</tr>
</tbody>
</table>
Notes:
1. Attach 5 to 6 using 14.
2. Slide 9 and 4 in order onto the shaft of 5.
3. Place 3 onto 4.

Use a few drops of cyanoacrylate glue to bond halves of 4 together.

If bearing is to be pressed in before this step of assembly, bearing flange should be on opposite face.

Notes:
1. Insert or press 1 into 7.
2. Slide 1 and 7 onto the shaft of 5, noting flange orientation.
3. Attach 1 and 7 to the assembly using 16 to space the plates and 11 and 13 to fasten. Be careful of belt routing.

Ensure belt is wrapped around pulley and is not wrapped around any of the spacers.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: 1/16
ANGULAR: 1°
TWO PLACE DECIMAL: .01
THREE PLACE DECIMAL: .005

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DRAWN: CO 6/24/2021

TITLE: Low Agitator Drive Assembly

VEND: NAME: DATE: 6/24/2021

SCALE: 2:3 SHEET 2 OF 4

SIZE: DWG. NO.: REV: B

CO

GE-22450
Notes:
1. If not already done, press or insert 1 into 6, noting flange orientation.
2. Slide items 2, 4, and 9 onto 10, being careful of order, and note orientation of 10 as only one side is tapped.
3. Slide shaft into place, aligning 3 onto 4, then aligning 10 with 1.
4. Attach 14 and 17 to 10. 17 must be large enough diameter to prevent shaft being pulled past bearing.
5. With bottom of 10 coincident with bottom of 1, and 2, 4, 9 all flush to each other and 1, tighten set screw on 2.

Use a few drops of cyanoacrylate glue to bond halves of 4 together.

Notes:
1. Insert or press 1 into 8.
2. Slide 1 onto the shaft 10, noting flange orientation.
3. Attach 1 to the assembly using 12 and 13 to fasten.
Notes:
2. Ensuring 2 is flush with 1, tighten set screw on 2.
**Notes:**
1. Attach 2 to 1 as shown using 4, 5, and 3.

**ITEM NO.** | **PART NUMBER** | **DESCRIPTION** | **QTY.**
--- | --- | --- | ---
1 | GE-22434 | Low Agitator Wheel Base | 1
2 | GE-22436 | AndyMark 1/2 in. Hex Hub | 1
3 | nylock_10_32 | Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size | 6
4 | round_hex_10_32_1_full | Round Head Hex, 10-32 x 1.00" long, fully threaded | 6
5 | washer_flat_10 | Flat Washer for #10 Screw | 6
ITEM NO. | PART NUMBER | DESCRIPTION | QTY.
--- | --- | --- | ---
1 | 42ef_dc | RightSight Sensor | 2
2 | 46CLR | 46CLR | 1
3 | GE-22462 | Sensor Plate | 1
4 | GE-22463 | Sensor Shield | 1
5 | GE-22464 | Color Sensor Bracket | 1
6 | hex_.25_20_0.75 | Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded | 2
7 | hex_.25_20_3.75_partial | Steel Hex Head Bolt, 1/4-20 x 3.75", partially threaded | 4
8 | nylock_.25_20 | Steel Nylon-Insert Locknut, 1/4-20 | 6
9 | nylock_M4 | Nylock M4 | 2
10 | Pan_phil_M4_35 | Pan Head Phillips Drive, M4 x 35mm Long, Fully Threaded | 2
11 | spacer_.252_5.25 | Spacer, .252 ID, .5 OD, 2.5 long | 4

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:
- FRACTIONAL: ±1/16
- ANGULAR: MACH ±1° BEND ±1°
- TWO PLACE DECIMAL: ±0.01
- THREE PLACE DECIMAL: ±0.005

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
- REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING
Notes:
1. Attach 5 to 3 using 6 and 8.
2. Attach 1 to 3.

Notes:
1. Attach 2 to 5 in orientation shown using 9 and 10.
Notes:
1. Tag or label with part number.
Notes:
1. Tag or label with part number.
Notes:
1. Tag or label with part number.
Notes:
1. Attach 2 to 1 in locations shown.
Notes:
1. Description: 9.5 inch oversized tennis ball, red
2. Source: AndyMark
3. Item#: am-4600_red
4. To be inflated to 3.5 PSI
Notes:
1. Description: 9.5 inch oversized tennis ball, blue
2. Source: AndyMark
3. Item#: am-4600_blue
4. To be inflated to 3.5 PSI
Notes:
1. Insert 1BX to 4 and 3.
2. Attach 2 to 4 and 3 with 1BX.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flat Hex 25_20_.75</td>
<td>Flat Hex 25_20_.75 8</td>
</tr>
<tr>
<td>2</td>
<td>GE-22601</td>
<td>Cable protector top angled 1</td>
</tr>
<tr>
<td>3</td>
<td>GE-22602</td>
<td>Cable protector side right angled 1</td>
</tr>
<tr>
<td>4</td>
<td>GE-22603</td>
<td>Cable protector side left angled 1</td>
</tr>
<tr>
<td>5</td>
<td>teeNut_ultra_split_rst_25_20</td>
<td>.25-20 T Nut ultra split resistant 8</td>
</tr>
</tbody>
</table>
Post Manufacturing Instructions

Align hook to edge as shown

1" hook fastener, adhesive backed

DIMENSIONS ARE IN INCHES

FRACTIONAL: 1/16

ANGULAR: MACH 1° BEND

TOLERANCES:

TWO PLACE DECIMAL: ± .01

THREE PLACE DECIMAL: ± .005

MATERIAL/FINISH:

REMOVE ALL BURRS AND SHARP EDGES.
Notes:
1. Material: 0.25" HDPE, Black high gloss smooth
2. Remove burrs and sharp edges.
3. Label with part number

Material/Finish:
HDPE Black, Smooth High gloss finish

TOLERANCES:
FRACTIONAL: \( \frac{1}{16} \)
ANGULAR: MACH \( \pm 1° \) BEND \( \pm 1° \)
TWO PLACE DECIMAL: \( \pm .01 \)
THREE PLACE DECIMAL: \( \pm .005 \)

Dimensions are in inches

UNLESS OTHERWISE SPECIFIED:

Scale: 1:8

Title: Cable protector top angled

First Robotics Competition

Proprietary and Confidential

The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
Remove all burrs and sharp edges.

Do not scale drawing

VEND | NAME | DATE
--- | --- | ---
| | | 6/7/2021

Drawing

Material/Finish: HDPE Black, Smooth High gloss finish

NOTES:
1. Material: 0.25" HDPE, Black high gloss smooth
2. Remove burrs and sharp edges.
3. Label with part number

A A
B B
C C
D D

REV

GE-22601

Sheet 1 of 1

1:8 Scale
Notes:
1. Material: 0.5" HDPE, Black high gloss smooth.
2. Remove all burrs and sharp edges.
3. Label with part number.

Material/Finish:
HDPE Black high gloss smooth

Scale: 1:8

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/16
ANGULAR, MACH: ±1°
TWO PLACE DECIMAL: ±0.01
THREE PLACE DECIMAL: ±0.005

COMMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

TITLE: Cable protector
side right angled

VEND: NW
NAME: NW
DATE: 6/8/2021
DRAWN: NW

SCALE: 1:8
REV: 1

SIZE: 8.5" x 11"
Notes:
1. Material: 0.5" HDPE, Black high gloss smooth.
2. Remove all burrs and sharp edges.
3. Label with part number.

Material/Finish:
HDPE Black high gloss smooth.

Dimensions are in inches.

Tolerances:
- Fractional: ±1/16
- Angular: Mach ±1° Bend ±1°
- Two Place Decimal: ±0.01
- Three Place Decimal: ±0.005

Proprietary and Confidential:
The information contained in this drawing is the sole property of FIRST®. Any reproduction in part or as a whole without the written permission of FIRST® is prohibited.

Comments:
Remove all burrs and sharp edges.

Do not scale drawing.

UNLESS OTHERWISE SPECIFIED:

Title: Cable protector side left angled

Scale: 1:8
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FE-00301</td>
<td>Side angle left</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>FE-00303</td>
<td>Side angle right</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>FE-00302</td>
<td>Cable protector top</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Flat Hex .25_20_.75</td>
<td>Flat Hex .25_20_.75</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>TeeNut Ultra_split_rst_25_20</td>
<td>.25-20 TeeNut ultra split resistant</td>
<td>10</td>
</tr>
</tbody>
</table>
Notes:
1. Insert 5 10X in to the bottom of 1 and 2.
2. Attach 3 to 1 on 2 with 4 10X.
Notes:
1. Insert 5 10X in to the bottom of 1 and 2.
2. Attach 3 to 1 and 2 with 4 10X.
Post Manufacturing Instructions

Align hook to edge and corner, 2 places

1" wide hook fastener, adhesive backed
5x 0.31 THRU ALL

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.001

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL
HDPE Black

FINISH
APPLICATION
DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:

DRAWN
CHECKED
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®, ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

TITLE: Side angle left

SIZE A
DWG. NO. FE-00301
REV
SCALE: 1:12 WEIGHT: SHEET 1 OF 1
SECTION A-A
End view
SCALE 1 : 1.5

10X ø .27 THRU ALL
\( \sqrt[\circ]{.51 \times 82^\circ} \)

SECTION A-A
End view
SCALE 1 : 1.5

Proprietary and Confidential
The information contained in this drawing is the sole property of FIRST. Any reproduction in part or as a whole without the written permission of FIRST is prohibited.
Assembly Notes:
1. Apply hook fastener to FE-00304.
2. Apply loop fastener to the hook fastener, but leave the plastic backing on the adhesive until assembly on the field.

Align hook and loop to edge as shown.

ITEM NO. | PART NUMBER | DESCRIPTION | QTY.
--- | --- | --- | ---
1 | FE-00304 | Cable protector exit segment | 1
2 | Hook_1_6 | 1" x 6" Hook, Adhesive Backed | 2
3 | Loop_1_6 | 1" x 6" Loop, Adhesive Backed | 2

UNLESS OTHERWISE SPECIFIED:
- DIMENSIONS ARE IN INCHES
- TOLERANCES: FRACTIONAL ±1/2" ANGULAR, MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.50"
- MATERIAL/FINISH:
- PROPRIETARY AND CONFIDENTIAL
- THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.
- COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING